Claims

We claim:

1. A compliant, dynamic coupling for preventing the flow of gas into a pressurized chamber, wherein a rod extends into the chamber through a chamber orifice and moves axially within the chamber, the seal comprising:

a bearing mounted within the orifice and disposed concentrically about the rod comprising an inner bearing surface that is in close proximity to an outer surface of the rod;

a gas port for supplying pressurized gas into a gas curtain defined by the gas flow between the rod and the inner bearing surface; and

a compliant member adjacent the bearing for absorbing a force created when the rod moves toward the inner bearing surface to reduce contact forces created when the rod contacts the inner bearing surface.

2. The compliant, dynamic coupling of claim 1 wherein the compliant member is a bellows that is disposed concentrically about the bearing.

3. An apparatus for selectively positioning a semiconductor wafer along an axis of excursion within a process chamber having a chamber surface that is perpendicular to the axis comprising:

a wafer support situated within the process chamber for supporting at least one semiconductor wafer as it is moved within the chamber;

an elevator tube that protrudes through an orifice in the chamber surface and is connected at a first distal end to the wafer support;

a compliant, dynamic coupling within the orifice that engages the elevator tube to form a gas curtain within a gap between the coupling and the elevator tube to seal the process chamber, the coupling comprising:

a bearing mounted within the orifice and disposed concentrically about the elevator tube comprising an inner bearing surface that is in close proximity to an outer surface of the elevator tube;

a gas port for supplying pressurized gas into a gas curtain defined by the gas flow between the elevator tube and the inner bearing surface; and

a compliant member adjacent the bearing for absorbing a force created when the elevator tube moves toward the inner bearing surface to reduce contact forces created when the elevator tube contacts the inner bearing surface

a moveable carriage connected to the elevator tube at a second distal end for moving the wafer support along the axis of excursion; and

mounting structure for coupling the second distal end to the carriage.

4. The apparatus of claim 3 wherein the compliant member comprises a bellows assembly concentric with the orifice.

5. The apparatus of claim 3 wherein the mounting structure is a plurality of flexures wherein each flexure fixes the elevator tube about a given axis of rotation.